

Final Criteria for Public Use Microdata Areas for the 2020 Census and the American Community Survey

SUMMARY: This document provides the U.S. Census Bureau’s final criteria for defining Public Use Microdata Areas (PUMAs) based on results from the 2020 Census. PUMAs are statistical geographic areas defined for the tabulation and dissemination of American Community Survey (ACS) and Puerto Rico Community Survey¹ Public Use Microdata Sample (PUMS) data² as well as ACS period estimates, and decennial census data. Nesting within states or equivalent entities,³ PUMAs cover the entirety of the United States, Puerto Rico, Guam, and the U.S. Virgin Islands.⁴ PUMA delineations are subject to population threshold criteria, “building block⁵” geography criteria, and geographic nesting criteria. State Data Centers (SDCs) define PUMAs with the cooperation of regional, state, local, and tribal governments, organizations, and other interested data users. Each PUMA must have a minimum population of 100,000 at the time of delineation and throughout the decade.

FOR FURTHER INFORMATION CONTACT: Direct requests for additional information on this program by email to Vincent Osier, Geography Division, U.S. Census Bureau, at <geo.puma@census.gov> or by phone to (301) 763-1128.

Note: The document contains cross-reference links shown in **bold, blue font**, the first of which is in section I. Use the Ctrl key on the keyboard and left mouse button to follow the link in the document.

SUPPLEMENTARY INFORMATION: Public Use Microdata Sample (PUMS) files contain individual records of the characteristics for a sample of persons and households.⁶ And for each decennial census since 1960, PUMS data have been tabulated and published for selected geographic entities. Until 1990, PUMS data were made available for various standard geographic units including states, counties, county groups, metropolitan areas, and urban areas. Since 1990, PUMAs have been delineated by the SDCs as a unique type of geographic area for the tabulation and dissemination of PUMS files.⁷

¹ The ACS is conducted in the United States and in Puerto Rico. In Puerto Rico the survey is called the Puerto Rico Community Survey (PRCS). For ease of discussion, throughout this document the term ACS is used to represent both the survey conducted in the United States and in Puerto Rico, as well as their data products.

² PUMS are files that contain individual records of the characteristics for a sample of persons and households.

³ States are the primary governmental divisions of the United States. The Census Bureau treats the District of Columbia, Puerto Rico, America Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands as statistical equivalents of a state for data presentation purposes. For Census Bureau purposes, the United States includes the fifty States and the District of Columbia.

⁴ There is only one PUMA delineated for each of the state equivalents of Guam and the U.S. Virgin Islands; therefore, the Guam and U.S. Virgin Islands State Data Centers do not delineate PUMAs. American Samoa and the Commonwealth of the Northern Mariana Islands do not meet the minimum population threshold for PUMS publication; therefore, PUMAs are not delineated in these areas.

⁵ Meaning the basic geographic entities (such as counties or census tracts) used to create PUMAs.

⁶ Further information about microdata, PUMS, and confidentiality of PUMS data is provided on the Census Bureau website. Please refer to <www.census.gov/main/www/pums.html> and <www.census.gov/programs-surveys/acs/microdata.html> for more details.

⁷ Further information about the history and geography of PUMS and PUMAs is provided on the Census Bureau website. Please refer to <www.census.gov/programs-surveys/geography/guidance/geo-areas/pumas.html>.

Place of work (POW) PUMAs and Migration (MIG) PUMAs were created for use in the publication of POW and MIG microdata files.⁸

I. Summary of Comments Received in Response to Proposed Criteria

The Census Bureau received several comments in response to the proposed criteria published on the [2020 PUMA website](#) on February 6, 2021. All the comments noted the change in the county-part threshold to 10,000 which may prevent the addition of a single tract to a PUMA from a neighboring county. This higher threshold was proposed primarily to account for new differential privacy controls implemented through the new Disclosure Avoidance System for the 2020 Census. The threshold of 10,000 will be enforced solely for new or changed PUMAs as detailed in the final criteria. As noted in section IV, letter C, number 5 (*PUMA Criteria and Guidelines for the 2020 Census – Geographic Entities Used to Define PUMAs*), PUMAs that currently have PUMA-county parts that meet the 2010 Census thresholds of 2,400 persons and remain unchanged will be allowed as exceptions. These thresholds will be implemented during the interactive software delineation and reviewed by the Census Bureau before finalization. In response to these questions, the proposed criteria will be published without any substantive change.

II. History of PUMAs from 1960 to 2010

Microdata and PUMS files have been produced for the decennial census starting with the 1960 Census. The production methodology and the sample used to create the files and the geographic entities used to present the data have undergone significant changes over the course of the program. PUMAs were first proposed and delineated for the 1990 Census by SDCs as a unique geographic area for the presentation of PUMS data, but similar geographic areas have been created since at least the 1970 Census. Until the 1990 Census, PUMS files were primarily defined using states, counties, metropolitan statistical areas, minor civil divisions (MCDs), places, and urban areas.

The PUMA program allowed data users, represented by the SDCs, to have input into the delineation process. This coincided with the development of the Topologically Integrated Geographic Encoding and Referencing (TIGER) Database, TIGER/Line Files, and digital maps produced from them. The wider availability of geospatial data allowed the creation of PUMAs to fulfill the public's need for the clear definition and presentation of geographic areas for mapping PUMS data.

For the 2000 Census two separate types of PUMAs were created: standard PUMAs representing a PUMS file with a sample size of 5 percent of the population, and super-PUMAs representing PUMS files with a 1 percent population sample size. Because of the smaller sample size within the 1-percent PUMS, super-PUMAs required a population of at least 400,000 persons.

For the 2010 Census, the Census Bureau did not produce a 1-percent PUMS file. As a result, only one type of PUMA was delineated, essentially maintaining the concept of the standard PUMA from 2000, for which only 5-percent PUMS files were created. The two additional major changes to the program were that: 1) noncontiguous PUMAs were not allowed (an exception was eventually allowed for delineation of PUMAs in Alaska), and 2) PUMA delineation required the use of only whole counties or census tracts⁹ as

⁸ POWPUMA and MIGPUMA geographies were based on one or more 5-percent PUMAs. In cases where 5-percent PUMAs encompassed one or more whole **counties**, the POWPUMAs and MIGPUMAs were equivalent to the PUMA geography; however, when 5-percent PUMAs contained other types of geographic entities, the POWPUMAs and MIGPUMAs were based on aggregations of two or more 5-percent PUMAs in order to encompass whole counties.

⁹ Use of the newly released census tracts following the 2010 Census was required.

the basic building block. PUMA criteria no longer allowed the use of MCDs and places directly in delineation, primarily because these geographic areas tend to change frequently over time (e.g., annexations and deannexations). There was a concern that as the frequency of PUMS files publication increased, the potential disclosure risk also increased if the underlying PUMA building block geography changed regularly.

In addition to PUMS data publication, as the ACS was developed and implemented after the 2000 Census, standard PUMAs were adopted as a basic tabulation geographic entity to present summary data. This was in response to concerns raised by SDCs and other stakeholders that the minimum population thresholds for tabulation and dissemination of 1-year and 3-year ACS data (65,000 and 20,000 persons, respectively) would limit the availability of data for the predominantly rural portions of states as well as for many counties. PUMAs met these population size requirements for all ACS data tabulations and their adoption resulted in a substantially larger community of PUMA data users, many of whom do not use PUMS files. This sustained interest in PUMA geography and associated data is expected to continue, therefore the PUMA criteria and guidelines for the 2020 Census are intended to help maintain a stable and comparable dataset.

III. Changes to PUMA Criteria for the 2020 Census

The Census Bureau will implement two substantive changes to the PUMA criteria for 2020:

- For PUMAs composed of tracts and covering less than entire counties, each unique PUMA-county part must have a population of at least 10,000 persons. This criterion is not applicable to below threshold tracts when the entirety of their county is included within the given PUMA. If a PUMA includes tracts in multiple counties, each unique PUMA-county relationship must have a total population of at least 10,000. This represents an increase from the threshold of 2,400 persons for the 2010 Census PUMA delineation. These changes are detailed below in section IV, letter C, number 5 (*PUMA Criteria and Guidelines for the 2020 Census – Geographic Entities Used to Define PUMAs*).
- A PUMA may consist of noncontiguous territory to encompass populations and communities that are more homogeneous and, therefore, more meaningful for the types of demographic and geographical analysis for which PUMS files and PUMAs are primarily intended. However, these noncontiguous areas must each also contain a population of at least 10,000.

IV. PUMA Criteria and Guidelines for the 2020 Census

A. Minimum Required Population and Maximum Suggested Population.

1. A long-established criterion of the PUMA program maintains that each PUMA must have a population of at least 100,000 at the time of delineation and throughout the decade. PUMAs with a population substantially below 100,000 persons present disclosure concerns for the ongoing publication of ACS PUMS and potentially for ACS estimates. If the population of a PUMA falls below the minimum population threshold of 100,000 through the decade, the Census Bureau may combine the PUMA with one or more adjacent PUMAs for ACS data publication to ensure data confidentiality. Therefore, those areas currently experiencing population decline, or where population decline is anticipated, should have PUMAs delineated to encompass a population substantially higher than 100,000 persons such that the population will remain above 100,000 throughout the decade. This is a strict criterion that will be enforced by Census Bureau staff as necessary.

2. As a guideline, the number of PUMAs should be maximized to the greatest extent which the population and geography allows. Any county with a population substantially more than 200,000 should be subdivided into multiple PUMAs. A single PUMA should not contain more than 200,000 persons unless it is defined for an area in which population decline is anticipated. There are some unique situations where PUMAs may contain more than 200,000 in population due to geographic constraints, but it should be avoided whenever possible.

B. Relationship Between PUMAs and Other Geographic Areas.

1. A PUMA must not cross state boundaries. This criterion will be strictly enforced. While they may have important relationships with other geographic areas that can cross state boundaries (such as metropolitan and micropolitan statistical areas; see below), PUMAs themselves cannot cross state boundaries. This criterion takes precedence over the guidelines listed below.
 2. As a general guideline, wherever possible each PUMA should comprise an area that is either entirely inside or entirely outside a core based statistical area (CBSAs). CBSAs are more commonly known as metropolitan statistical areas and micropolitan statistical areas.
 3. The Census Bureau recommends carefully considering the following guidelines during delineation:
 - i. 2020 Census place definitions, 2010 Census urban area definitions, and local knowledge should all inform PUMA delineations.
 - ii. PUMAs should avoid splitting Census Bureau urban areas. Although the 2020 Census urban areas will not be available at the time of PUMA delineation, local knowledge and the use of 2010 Census urban area boundaries can help to prevent 2020 Census urban areas from becoming split between multiple 2020 Census PUMAs.
 - iii. PUMAs should not unnecessarily split governmental MCDs. Whenever possible, an MCD with an active, functioning government should be within a single PUMA.
 - iv. PUMAs should avoid unnecessarily splitting American Indian, Alaska Native, or Native Hawaiian areas. Specifically, PUMAs should avoid splitting American Indian reservations and/or off-reservation trust lands (AIRs/ORTLs) if population is included within all parts of the split AIRs/ORTLs. Since AIRs/ORTLs may cross state boundaries, this guideline applies only to the portion of an AIR/ORTL within a given state. In all such instances, the total population and makeup of the affected areas should be considered in any decisions regarding the adjustment of PUMAs for AIRs/ORTLs.
- Figure 1** depicts PUMA boundary delineations in Carlton County, Minnesota to avoid unnecessarily splitting of the Fond Du Lac Reservation.

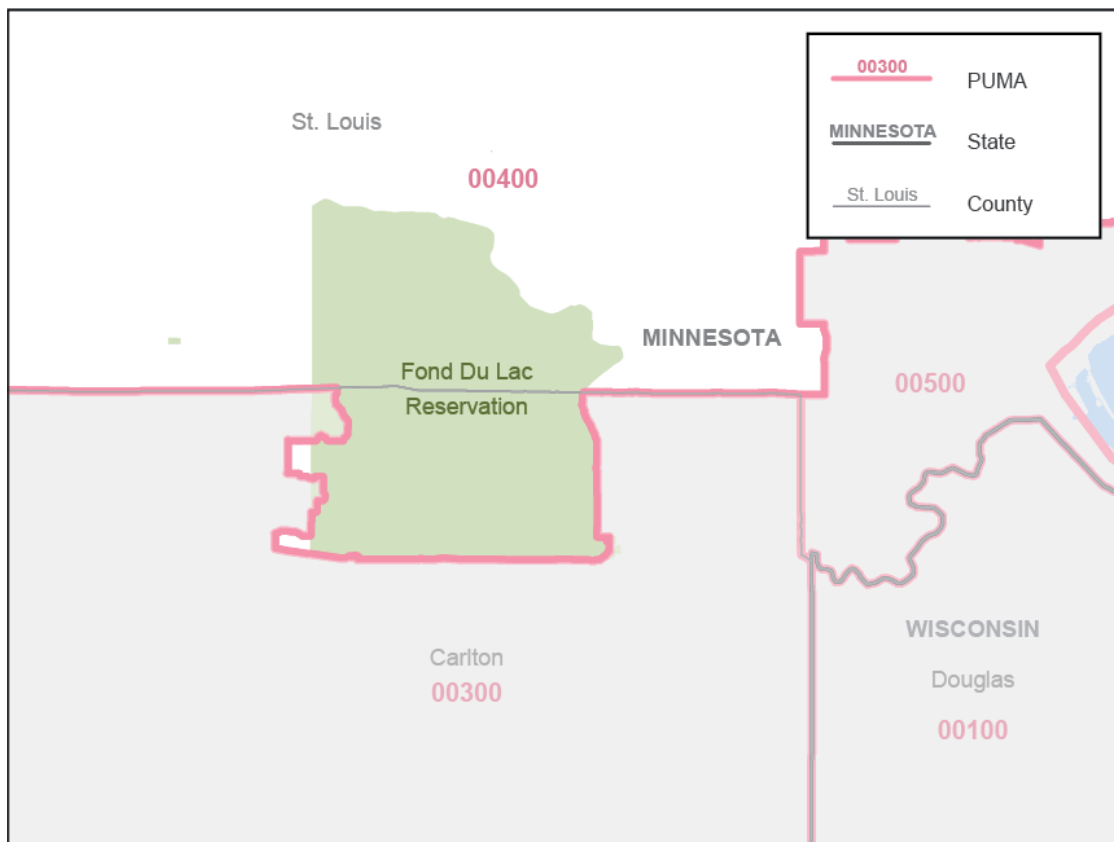


Figure 1: Minnesota PUMA 00400 includes the entirety of the Fond du Lac Reservation

C. Geographic Entities Used to Define PUMAs.

1. Counties (and equivalent entities¹⁰) and census tracts will be the geographic building blocks for PUMAs. This is a strict criterion maintained from the 2010 Census. Because annual ACS PUMS data are published for these areas, there is an increased disclosure risk if the underlying PUMA building block geography changes regularly (e.g., incorporated places or MCDs) between decennial censuses. These changes can result in sliver geography between the standard PUMA (a static delineation based on the decennial census geography) and POWPUMAs and MIGPUMAs (based, in concept, on the current definition of the underlying incorporated place or MCD) since the POW and MIG data are coded to the current geography and not the decennial census geography.
2. A single county may be designated as a PUMA if it meets the minimum threshold of 100,000 persons. [Figure 2](#) illustrates an example of a single county PUMA for all of Humboldt County, California (2010 Census population of 134,623).

¹⁰ Includes parishes in Louisiana; boroughs and census areas in Alaska; independent cities in Maryland, Missouri, Nevada, and Virginia; districts in American Samoa; the three main islands of the U.S. Virgin Islands; municipalities in the Northern Mariana Islands; municipios in Puerto Rico; and the entire areas constituting the District of Columbia and Guam.

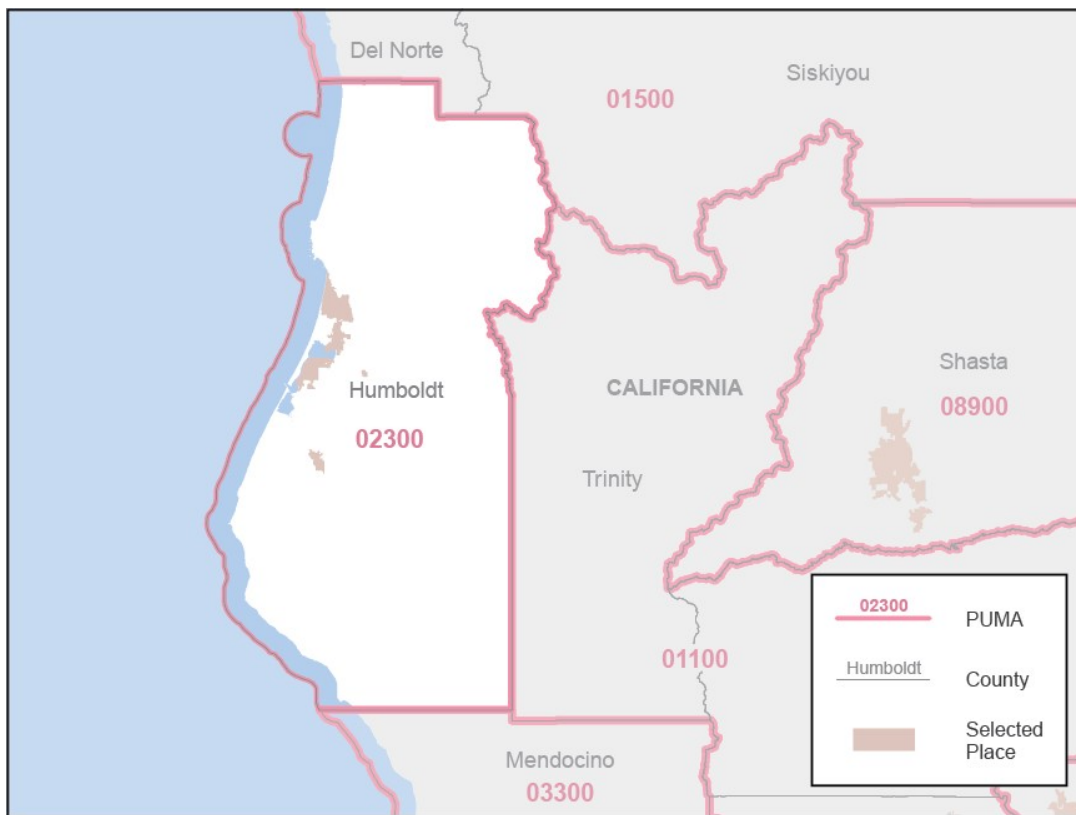


Figure 2: California PUMA 02300 comprising a single county

3. Two or more contiguous counties may be aggregated to create a PUMA. [Figure 3](#) depicts an example of a PUMA comprising more than one county.

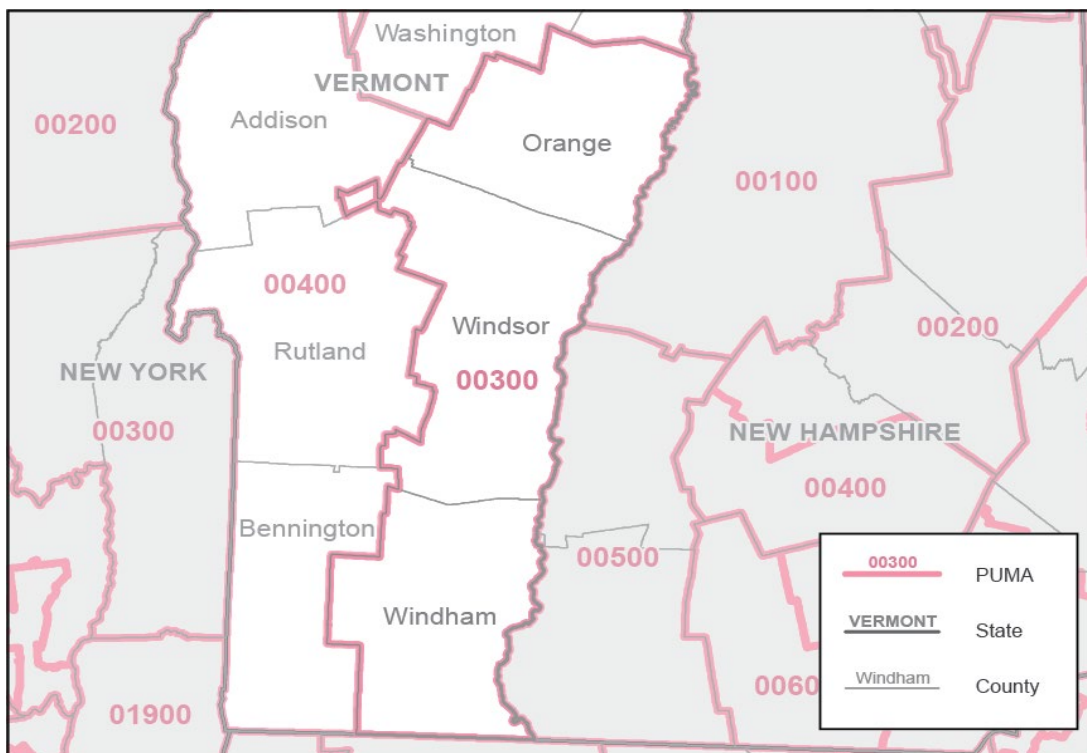


Figure 3: Vermont PUMA 00300 comprising three whole counties

4. Counties with populations of 200,000 or more should be subdivided into PUMAs defined by census tracts. This guideline allows the aggregation of census tracts to approximate the extent of other geographic entity types, such as MCDs, incorporated places, census designated places (CDPs), and/or urban areas.
5. Census tract-based PUMAs may cross county boundaries provided that each PUMA-county part meets a minimum population threshold of 10,000 persons. This minimum population threshold for census tract populations that cross county boundaries (i.e., a PUMA-county part) is an increase from the 2,400-person minimum applied in 2010. This is intended to further ensure confidentiality of data within a PUMA-county part, align with 2020 Census urban area plans, and eliminate unique geographic areas with low population. While this threshold is a strict criterion, the Census Bureau will consider continued approval of stable census tract-level PUMA-county parts defined for the 2010 Census that met the 2,400-person threshold or consider unique situations created by exceptional local geographies. These will be reviewed and considered on a case-by-case basis. In [Figure 4](#), the census tract in Bingham County, Idaho met the PUMA population threshold of 2,400 for 2010, but should be reviewed to determine if it should remain as such after the 2020 Census.

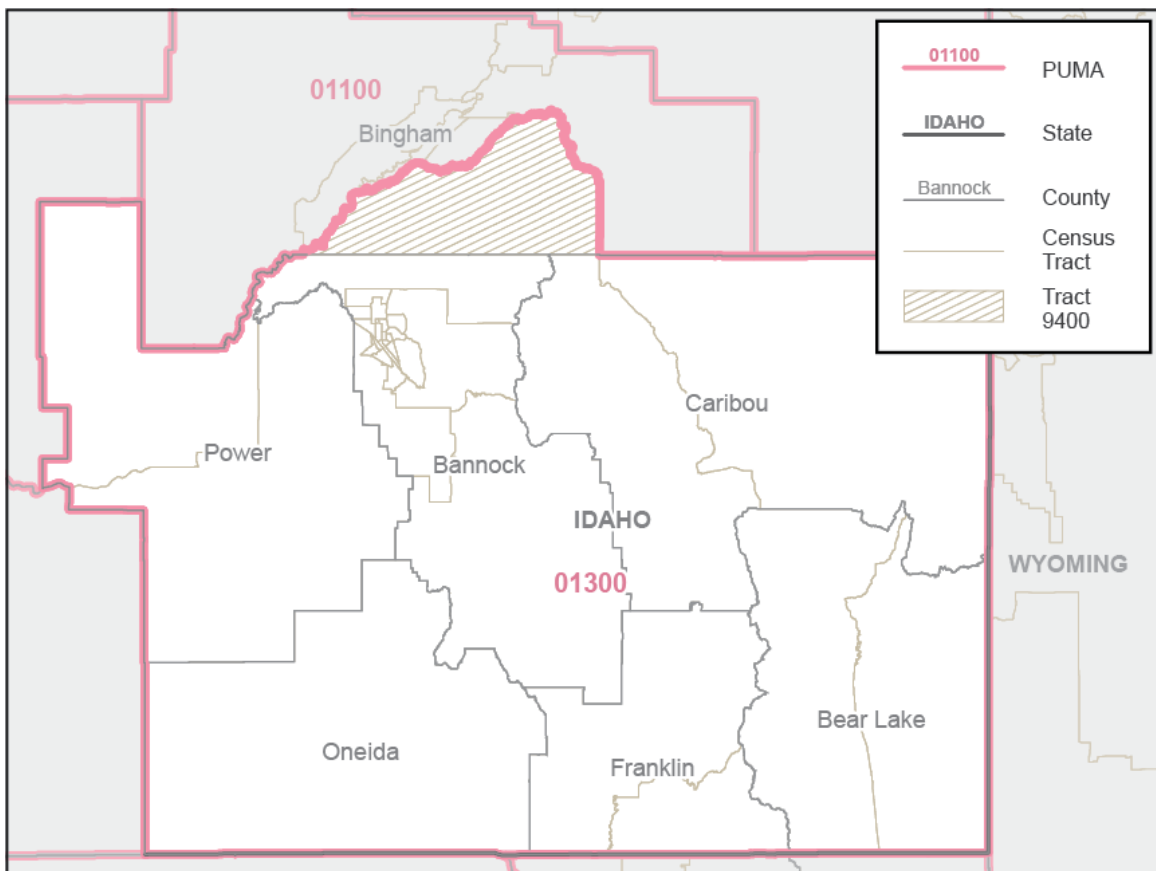


Figure 4: Idaho PUMA 01300 comprising six whole counties and a single census tract from a seventh county

D. Contiguity and Noncontiguity Guidelines in the Delineation of PUMAs.

1. To the greatest extent possible, each PUMA should encompass a single, geographically contiguous area.
2. The Census Bureau will consider permitting noncontiguous PUMAs when:
 - i. The county, counties, or census tracts that form the building blocks of the PUMA consist of noncontiguous areas.¹¹
 - ii. Use of noncontiguous building blocks facilitates delineation of PUMAs that are more demographically homogeneous and therefore are more meaningful for the types of demographic and geographical analysis for which PUMS files and PUMAs are primarily intended. This change from the 2010 Census criteria is not intended to allow or encourage the delineation of highly fragmented PUMAs, made up of many pieces containing small amounts of population or area. To prevent this, the Census Bureau will review submissions to confirm that each portion of a resulting noncontiguous PUMA contains a population of at least 10,000 persons. All noncontiguous PUMAs are subject to the Census Bureau's final review and approval.

E. Place of work (POW) and Migration (MIG) PUMAs.

POWPUMAs and/or MIGPUMAs¹² are aggregates of standard PUMAs and can consist of a single PUMA for county-based PUMAs, or a combination of adjacent tract-based PUMAs. When combined, these larger PUMAs may be aggregates of one or more complete counties. An example is provided in [Figure 5](#). Poorly defined PUMAs that unnecessarily split economic or population centers can in some cases result in POWPUMAs and MIGPUMAs that are overly large and POW and MIG PUMS data that are much less useful for data users. The guidelines in section IV, letter B, number 3 (*PUMA Criteria and Guidelines for the 2020 Census – Relationship Between PUMAs and Other Geographic Areas*) should be carefully considered when defining standard PUMAs, as they are the building blocks for POWPUMAs and MIGPUMAs.

¹¹ In these situations, the population threshold of 10,000 per PUMA-county part is not applicable, as each building block is treated as one single unit, meaning that each discrete polygon comprising a noncontiguous county or tract does not need to meet the threshold.

¹² The Census Bureau publishes POW and MIG PUMS files to provide detailed characteristics regarding workers and their workplaces and detailed characteristics for migrants, respectively.

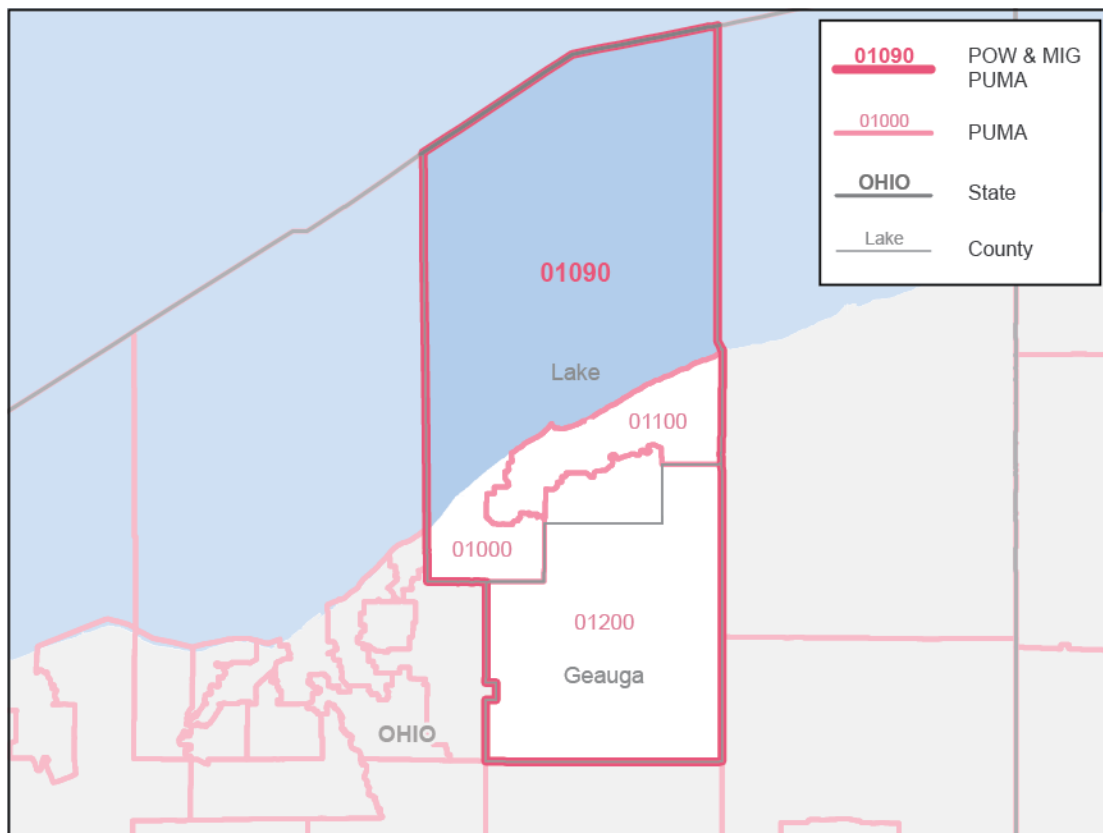


Figure 5: Ohio POWPUMA/MIGPUMA 01090 comprising three standard PUMAs from two counties

F. PUMA Naming Guidelines

1. Where applicable, descriptive PUMA names may be assigned by SDCs to individual areas or regions to aid location. The goal is to provide useful names that are meaningful to program participants and identify clearly, but succinctly, the places or communities located within the PUMA. Guidance on naming will be provided along with program materials.
2. Deference will be given to the PUMA names submitted by the program participants; however, the Census Bureau reserves the right to edit PUMA names as necessary to adhere to programmatic and technical needs.
3. If the PUMA name from 2010 is still acceptable and the geographic extent of a proposed PUMA is primarily unchanged, the PUMA name from the 2010 Census should be retained after the 2020 Census.

G. PUMA Code Guidelines

1. If the geographic extent of a proposed PUMA is unchanged from the 2010 Census, the Census Bureau will attempt to retain the same PUMA code.
2. When a PUMA has changed in geographic extent, SDCs should indicate their preferences to retain codes for specific PUMAs to aid in comparability, or to assign new codes to indicate a lack of comparability, otherwise the Census Bureau may assign new PUMA codes.